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User's Guide for LTGSTD24 Program Version 2.4

R. L. Hanlon
L. M. Connell

May 1993

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
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Pacific Northwest Laboratory
Richland, Washington 99352

SUMMARY

On January 30, 1989, the U.S. Department of Energy (DOE) promulgated an interim rule entitled "Energy Conservation Voluntary Performance Standards for New Commercial and Multi-Family High Rise Residential Buildings; Mandatory for New Federal Buildings" (10 CFR Part 435, Subpart A). These standards require federal agencies to design all future federal commercial and multifamily high-rise residential buildings in accordance with the standards, or demonstrate that their current requirements already meet or exceed the energy-efficiency requirements of the standards.

Although these newly enacted standards do not regulate the design of non-federal buildings, the DOE recommends that all design professionals use the standards as guidelines for designing energy-conserving buildings. To encourage private sector use, the DOE published the standards in the January 30, 1989, *Federal Register* in the format typical of commercial standards. The Pacific Northwest Laboratory developed several computer programs for the DOE to make it easier for designers to comply with the standards.

One of the programs, LTGSTD24 (Version 2.4), is detailed in this user's guide and is provided on the accompanying diskettes. The program will facilitate the designer's use of the standards dealing specifically with building lighting design. Using this program will greatly simplify the designer's task of performing the calculations needed to determine if a design complies with the standards.

ACKNOWLEDGMENTS

We greatly appreciate the assistance of several individuals who provided us with helpful comments on the computer program described in this user's guide. Our thanks are extended to Craig C. Conner, Drury B. Crawley, Mark A. Halverson, Ronald E. Jarnagin, Cherylyn Kelser, Paula K. Riesen, and Susan M. Thelen. We especially wish to thank Rob S. Briggs for the original version of this manual and help on the design of this software.

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1.0 INTRODUCTION

In accordance with Title III of the Energy Conservation and Production Act of 1976, the U.S. Department of Energy (DOE) is developing energy conservation performance standards for new buildings. The law provides that the standards will be voluntary for new nonfederal buildings but mandatory for new federal buildings.

On January 30, 1989, the DOE promulgated interim energy conservation performance standards (10 CFR Part 435, Subpart A) for new commercial and multifamily high-rise residential buildings. Within 180 days of the promulgation date, federal agencies were required to design all future federal commercial and multifamily high-rise residential buildings in accordance with the interim standards, or demonstrate that their current standards satisfy the energy-efficiency requirements of the interim standards. The interim standards do not regulate the design of nonfederal buildings, although the DOE encourages designers to use the standards as guidelines to design energy-conserving buildings.

The interim standards represent a significant federal effort to assist the private sector in developing energy conservation standards. Congress has directed federal agencies to regulate their design practices to set an example that may be transferred to the private sector through adoption of similar standards.

To facilitate transfer to private design practices, the January 1989 interim standards are presented in the format of commercial standards rather than that typical of federal regulations. For the same reason, the interim standards also contain extensive explanatory material not normally included in federal standards.

The Pacific Northwest Laboratory (PNL)[a] developed a computer program for the DOE that makes it easier to use the standards. The program, LTGSTD24 (Version 2.4), is designed to help building designers and other users of the

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interim standards determine the building lighting requirements and calculate whether the building design complies with these requirements.

This user's guide explains the scope and operation of the computer program. Section 2.0 contains generic instructions for installing the program on a computer and conventions used in this guide. The data required for the program and the operation of function and cursor control keys are described in Section 3.0.

Two diskettes (3-1/2 in. and 5-1/4 in.) containing the program and related example data files are included at the back of this user's guide. The files contained on the diskettes are listed in Appendix A. If the diskettes included in this guide do not contain the files listed, contact

Building Energy Standards Program Office
Pacific Northwest Laboratory
P.O. Box 999, MSIN K5-02
Richland, WA 99352
Facsimile (509) 375-3614

Other appendixes in this guide provide useful support information. Hard-copy examples of data files created using the program are provided in Appendix B. Appendix C contains the numeric codes used for specifying building types, exterior area types, and space types. Appendix D includes a user comment form. Use this form to provide comments or to report program problems.

2.0 GETTING STARTED

The LTGSTD24 program (Version 2.4) is provided on the diskettes at the back of this user's guide. The two diskettes (3-1/2 in. and 5-1/4 in.) contain the program and related example data files. The files contained on the diskettes are listed in Appendix A.

2.1 REQUIRED EQUIPMENT

The following equipment is needed to run the LTGSTD24 program:

- an MS-DOS compatible computer that has
  - at least 384K RAM
  - two floppy disk drives or a floppy disk drive and a hard disk drive
- a monochrome or color monitor[a]
- MS-DOS Version 2.0 or later.

A math coprocessor, often called an 8087, 80287, or 80387 chip, is optional but significantly increases the speed with which the program performs the calculations.

2.2 INSTALLING THE PROGRAM

Before installing or using the program, make a copy of the diskette containing the program software. Refer to the DOS reference manual for instructions on formatting and copying diskettes.

The configuration of the computer you are using will determine which installation instructions to follow. Section 2.2.1 gives instructions for a computer with two floppy disk drives. Section 2.2.2 gives instructions for a computer with both a floppy and a hard disk drive. Both sets of instructions

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(a) The program uses color to distinguish data positions from other parts of the program. You do not need a color monitor, however. The colors will appear as different shades of grey on monochrome monitors.

were written assuming that the computer has been started with the DOS operating system[a] and has a DOS prompt on the screen.

2.2.1 Computers with Two Floppy Disk Drives

To run the program on a computer with only one or two floppy disk drives and no hard disk, insert the copy of the program diskette into drive A:. Make drive A: the current drive by typing **A:**. To start the program from drive A:, type the name of the program, **LTGSTD24**, and press **Enter**. After the title and disclaimer screens appear, press any key to continue and the first input screen will appear.

2.2.2 Computers with a Hard Disk Drive

If your computer has a hard disk drive, copy the program onto the hard disk. Using the hard disk reduces the time required to load and save data files. The first step in copying the LTGSTD24 program files to the hard disk is to create a directory for those files. Directories allow you to organize files into related groups. Put all the files from the program diskette into the same directory. The following instructions assume that the directory name is STANDARD, but any name allowed by DOS can be used for the directory.

- Make sure that the *C:>* prompt is on the screen. Type **C:** and press **Enter**.
- Type **md C:\STANDARD** (make directory) and press **Enter**. This DOS command creates a directory on the hard disk called STANDARD under the main root directory (C:). The DOS manual contains more information about creating and using directories.
- Type **cd C:\STANDARD** (change directory) and press **Enter**. This DOS command makes STANDARD the current default directory.

Now copy the files from the program diskette to the hard disk.

- Insert the program diskette into drive A:.

(a) For computers with one or two floppy disk drives, insert the DOS diskette into drive A: and turn on the computer.

For computers with DOS installed on the hard disk drive, turn on the computer. The screen will then show a **C:>** prompt. The instructions given for computers with hard disk drives assume that DOS is already on the hard disk and the hard disk is designated drive C:.

- Type **copy A:*.* C:\STANDARD*.*** and press **Enter**. This DOS command copies every file from the diskette in drive A: to the current STANDARD directory on the hard disk, drive C:.

To run the program, change the current default directory to the directory created for the program (**cd C:\STANDARD**). To start the program, type the name of the program, **LTGSTD24**, and press **Enter**. After the title and disclaimer screens appear, press any key to continue and the first input screen will appear.

2.3 USING THE GUIDE

Throughout the remainder of this user's guide, the following conventions are used:

- Function keys are written in a **bold** typeface (e.g., the **F1** function key).
- Cursor control keys are written in a **bold** typeface. The following cursor control keys are used in the program:

←	left arrow cursor key
→	right arrow cursor key
↑	up arrow cursor key
↓	down arrow cursor key
Home	Home key
PgUp	Page Up key
PgDn	Page Down key
Esc	Escape key
Del	Delete key
Ins	Insert key
Enter	Enter or Return key
Backspace	Backspace key

Specific instructions for using the function and cursor control keys are provided in Section 3.0.

3.0 USING THE LTGSTD24 PROGRAM

Instructions for using the LTGSTD24 program are given in this section. The LTGSTD24 program (from LighIinG STanDards) was designed to help users assess whether a particular building complies with the lighting requirements detailed in Sections 3.3, 3.4, and 3.5 of the standards (10 CFR Part 435, Subpart A). The calculations performed by the LTGSTD24 program *duplicate the requirements and compliance calculations contained in Sections 3.3, 3.4, and 3.5 of the standards* with the exception of the exemptions listed in Section 3.1.3 of the standards, which the user should read.

To evaluate compliance of a proposed design with the lighting requirements of the standards, you must enter data about the proposed lighting configurations. This data is entered on four input screens 1) the Main screen, 2) the Space screen, 3) the Controls screen, and 4) the Exterior Lighting screen. Figure 3.1 illustrates the layout of these screens and the keys required to move among them. Instructions for interacting with each input screen are provided in detail in Sections 3.1 through 3.4 of this guide.

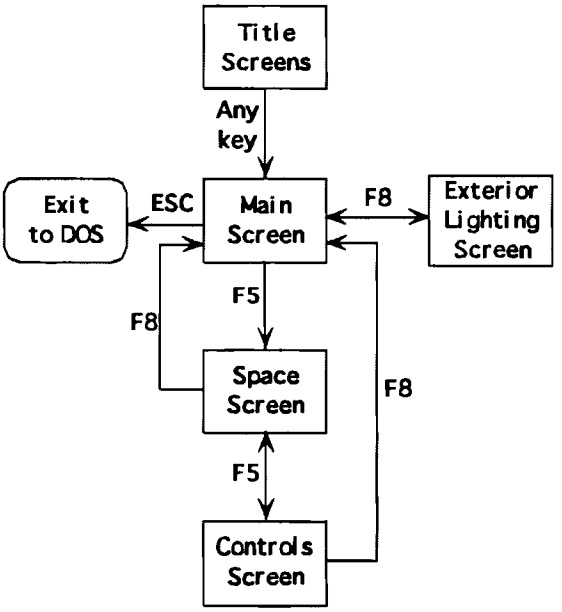

FIGURE 3.1. LTGSTD24 Screen Layout

The data files created by this program are ASCII files which can be sent directly to most printers (except postscript printers) or imported to most word processors. The data files all have an .LTG extention.

For additional assistance in using LTGSTD24, the program diskettes contain example data files to demonstrate how the program works. Hard copies of these files are also included in Appendix B. The files were created by first applying the standards to three buildings and then using the data from those buildings as input to the LTGSTD24 program. To review any of the data files from within the program, press **F1** (load). A list of LTGSTD24 data files in the current directory will appear. You will be prompted for a filename. Type the name of the file (**MEDOF24**, **BANK24**, or **APART24**) and press **Enter**. The program will load the information contained in the file and will perform a calculation based on that information.

3.1 MAIN SCREEN

On the Main screen, enter information about the building type, floor area, interior and exterior design lighting power (watts), and a building project description and date. The LTGSTD24 program automatically calculates the compliance values for Interior Lighting Power Allowance (ILPA). The Exterior Lighting screen must be completed to calculate the Exterior Lighting Power Allowance (ELPA). The Space screen must be completed for the System Performance Criteria to be calculated. If the design lighting power does not exceed the compliance values, the building design complies with the power requirements of the standards. The Main screen is shown in Figure 3.2. The cursor control keys, function keys, and data required for this screen are described in the following sections.

3.1.1 Colors on the Main Screen

There are six colors used on the main screen: gray, light blue, dark red, light red, dark green, and light green. Gray is used to show text labels and calculated values. Light blue is used to indicate user input fields. These two colors are visible at all times.

Two shades of red and green are used to indicate compliance or lack of compliance. Green indicates compliance, red indicates non-compliance. Dark

green and dark red are used for exterior lighting fields (Exterior CLP and the Exterior Lighting Power Allowance) as well as the 'Exterior' message at the bottom of the screen. Light green and light red are used for interior lighting fields (Interior CLP and the Prescriptive Criteria, or ALP and the System Performance Criteria) as well as the 'Interior' and 'Controls' messages at the bottom of the screen.

3.1.2 Main Screen Input Values

The Main screen has four required inputs: building type code(s), building floor area(s), and the Connected Lighting Power (CLP) for both the building interior and exterior. The building description and date entries are optional.

BUILDING TYPE Enter a character from A to K to designate the appropriate building occupancy (or N for None) when using the prescriptive compliance path (Section 3.4 of the standards). Alternatively, press **F6**, move the cursor to the appropriate building type code, and press **Enter**. The LTGSTD24 program allows from one to three different building types in a single building. Each type must be for at least 10% of the total lighted space. The prescriptive path is for the building type codes listed. This option is intended

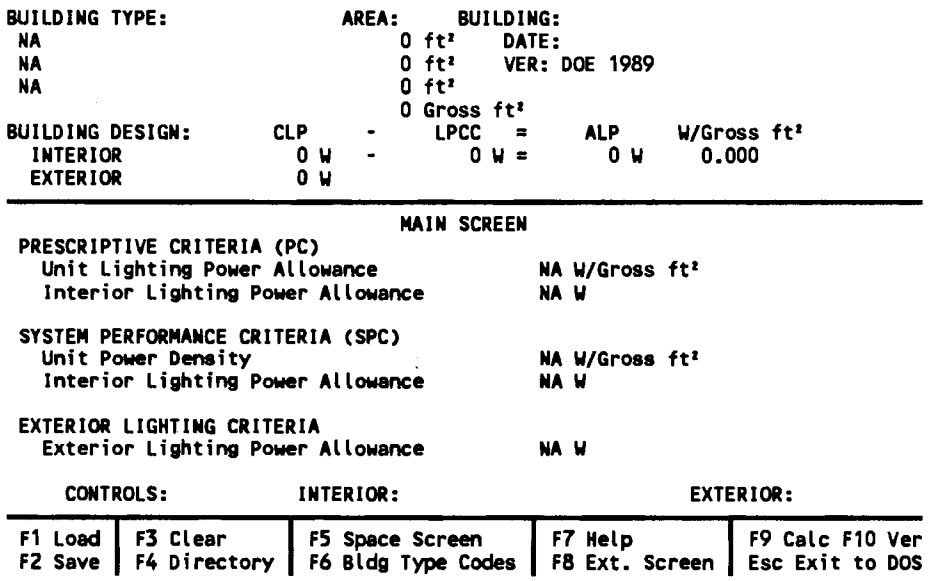

FIGURE 3.2. Main Screen

primarily for use with core and shell buildings or during the preliminary design phase with only a few occupancies. The building type codes are also listed in Table C.1.

AREA Enter either the gross area of the entire building or, if significant amounts of different building/occupancy types are present, the gross area of each. The program and the standards require that different building/occupancy types be at least 10% of the gross building area to be considered. The program accepts values from 0 to 99,999,999 ft^2.

BUILDING Identify the project being evaluated. The building name or description is limited to 30 characters. (Optional field)

DATE Record the date and the initials of the individual conducting the evaluation. A maximum of 30 characters may be entered. (Optional field)

VER Set the version of the standards as the 1989 DOE interim standard, the 1993 DOE standards, or the ASHRAE Standard 90.1. The version is set by pressing the **F10** key and cycling through the versions. Each version uses different table values for arriving at compliance requirements. This field defaults to DOE 1989.

INTERIOR Enter the total Interior Connected Lighting Power (CLP) for the building as it has been designed. Include the power required for supplemental and task-related lighting provided by plug-in luminaires as well as permanently installed lighting. The program accepts values from 0 to 999,999,999 W. After calculation (**F9**) this number may turn red to indicate non-compliance or green to indicate compliance. See Section 3.1.1 of this guide for a description of these colors. The exemptions listed in Section 3.1.3 of the standards should not be included in this value.

EXTERIOR Enter the total Exterior Connected Lighting Power (CLP) for the building as it has been designed. Include all power used for illumination of roads, grounds, and building exteriors that is energized through the building electrical service. The program accepts values from 0 to 999,999,999 W.

3.1.3 Main Screen Calculated Values

Gross ft^2 This value is the sum in square feet of all the building types entered in the three Building Type fields.

LPCC The Lighting Power Control Credit (LPCC) is credit gained by using automatic lighting controls. LPCC is figured from the Credit column of the Control screen (see Section 3.3.1 of the standards for details). LPCC is subtracted from the Interior

Connected Lighting Power (CLP) to produce the Adjusted Lighting Power (ALP).

ALP — The Adjusted Lighting Power (ALP) is the total watts of installed power minus any Lighting Power Control Credit (LPCC). This number may be used to check the compliance of the design. It may turn red or green after a calculation (**F9**). The meaning of these colors is described in Section 3.1.1 of this guide.

W/Gross ft² — This number is the Adjusted Lighting Power divided by the total area of the building. It is provided to use in the Lighting row of the ENVSTD program [Hanlon 92].

PRESCRIPIVE CRITERIA (PC) — This number is expressed both as the Unit Lighting Power Allowance in W/Gross ft² and as the Interior Lighting Power Allowance in total installed watts. The Interior Lighting Allowance is the maximum number of watts allowed by the prescriptive method of compliance.

SYSTEM PERFORMANCE CRITERIA (SPC) — This number is expressed both as the Unit Power Density in W/Gross ft² and as the Interior Lighting Power Allowance in watts. The Interior Lighting Power Allowance is the maximum number of watts allowed by the system performance method of compliance. This value is calculated from information on the Space screen.

EXTERIOR LIGHTING CRITERIA — This number is the maximum number of watts allowed for the exterior lights. This number is calculated from the Exterior Lighting screen information.

3.1.4 Main Screen Cursor Control Keys

The keys described below allow cursor movement in the Main screen:

Backspace — deletes the last character of a column.

← — moves the cursor one column to the left. If at the first column, this key moves the cursor to the last column of the previous row.

→ — moves the cursor one column to the right. If at the last column, this key moves the cursor to the first column of the next row.

↑ — moves the cursor up one row to the start of the row above it. If on the top row, this key moves the cursor to the bottom row.

↓ — moves the cursor down one row to the start of the row below. If on the bottom row, this key moves the cursor to the top row.

3.1.5 Main Screen Function Keys

The following function keys allow you to calculate compliance, save and recall LTGSTD24 data files, and access additional features.

F1 lists all data files in the current directory that have the extension .LTG. You are prompted for a filename to load into the LTGSTD24 program. Enter the filename without the .LTG extension. Files created with either LTGSTD21 or LTGSTD24 are accepted by the program.

F2 saves a LTGSTD24 data file to disk. The files are saved as ASCII files, allowing you to print or edit them using a text editor or word processor. Enter the filename without the .LTG extension. Any legal DOS filename of up to eight characters can be used.

F3 clears all data from the Main screen, the Space screen, the Controls screen, and the Exterior Lighting screen. All values are initialized to zero.

F4 displays a list of all LTGSTD24 data files in the current directory with an .LTG extension.

F5 switches the display from the Main screen to the Space screen.

F6 displays the building type descriptions and codes in a menu. The menu will only be displayed if the cursor is in a Building Type field. Once the menu is displayed, move the cursor to the desired building type and press **Enter** to select it. Press **ESC** to return to the Main screen without making a selection.

F7 displays a context-sensitive help message pertaining to the current field. Press any key to return to the Main screen.

F8 changes the display from the Main screen to the Exterior Lighting screen.

F9 calculates the Interior Lighting Power Allowance for both the prescriptive and system performance compliance path and the Exterior Lighting Power Allowance. The program also shows if the design values comply.

F10 is a 3-way toggle which changes the requirements calculated for the criteria from DOE 1989 values to DOE 1993 values to ASHRAE 90.1 values. Each version uses different table values for arriving at compliance requirements.

Esc exits the program.

3.2 SPACE SCREEN

In this section, the input values, calculated values, cursor control keys, and function keys for the Space screen are described. The Space screen is shown in Figure 3.3. On this screen, enter information about the building space such as space number designation (optional), space type code, area or dimensions, ceiling height, and number of spaces. The space type description corresponding to the current cursor position is displayed at the top of the screen. The program automatically calculates the Area Factor (AF), Unit Power Density (UPD), Base Unit Lighting Power Allowance (PB), Lighting Power Budget (LPB) based on the space data, and Total Lighting Power Budget (TOTAL LPB). It also sums the total building area.

3.2.1 Space Screen Input Values

Up to 500 spaces can be entered for a single building. Data can be entered in any order, but incomplete records will not be included in the compliance calculations.

SPACE NO. Enter space numbers to identify individual spaces within the building. Combinations of up to four characters are allowed. The space number field is optional.

SPACE TYPE Enter an integer from 1 to 131 to designate the appropriate space type code. Alternatively, press **F6**, move the cursor to the appropriate space type code, and press **Enter**. If the space type or activity is not represented in the list, select the code with the most similar space type or activity. Space type codes are listed in Table C.3.

DIMENSIONS Enter the length and width of the space in feet. The program will automatically calculate the floor area. Alternatively, the length and width of the space can be left blank and the area can be entered directly. The program accepts dimensions from 0 to 999 ft.

AREA Enter the floor area of the space in square feet. Alternatively, the length and width of the space in feet can be entered under the Dimensions column and the floor area will be calculated automatically. The program accepts values from 0 to 999,999 ft^2.

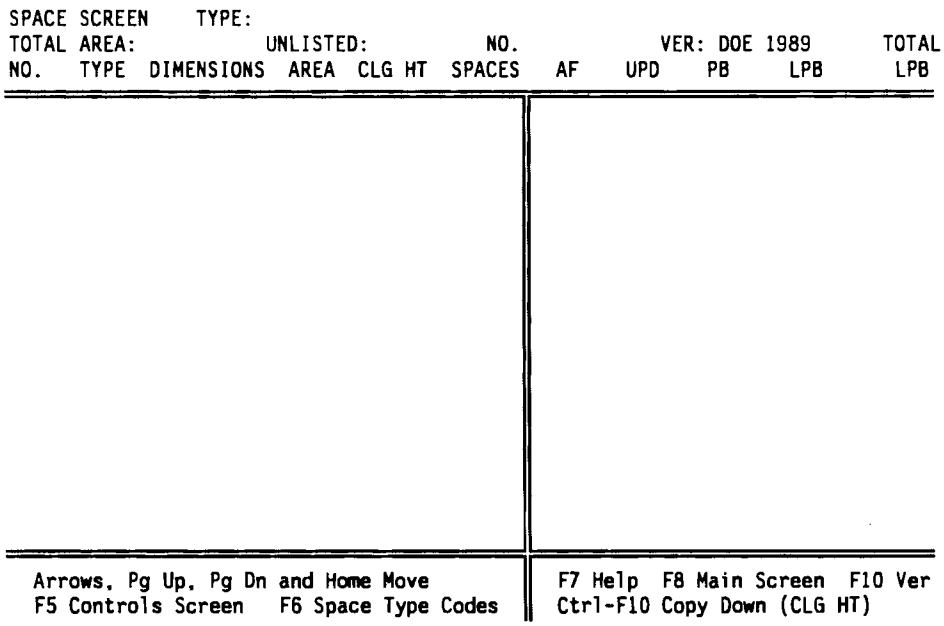

FIGURE 3.3. Space Screen

CLG HT Enter the height of the ceiling in feet. The program uses the ceiling height to calculate the Area Factor (AF) for each space. The program accepts values from 0 to 500 ft.

Alternatively, enter all other data, then return to the first data line and enter the typical ceiling height. Then press **Ctrl-F10**. The program will automatically copy the ceiling height to all lines with data.

NO. SPACES Enter the number of spaces in the building that are exactly like the one described. This value serves as a multiplier, allowing you to enter multiple spaces in a single entry. The program accepts values from 0 to 99. If the spaces have different lighting controls, each space with different control types must be entered separately. For example, if there are three 10 ft by 8 ft rooms and two have automatic switches and one has a manual switch, the two rooms with automatic switches are entered as one description with the number of spaces set to 2. The room with the manual switch is described separately with the number of spaces set to 1.

3.2.2 Space Screen Calculated Values

TOTAL AREA This value is the sum of all listed spaces on this screen.

UNLISTED This is the total gross area of the design (from the Main screen) minus the total area of the listed spaces. It indicates how much space is left in the building. If the unlisted number is red, more space has been defined than the total gross area of the building.

AF The Area Factor (AF) is a multiplying factor that adjusts the Unit Power Density (UPD) for spaces of various sizes to account for the impact of room configuration on lighting power utilization.

UPD Unit Power Density (UPD) is the lighting power density in W/ft^2 allowed in the type of space defined.

LPB The Lighting Power Budget (LPB) is the lighting power, in watts, allowed for an area or activity.

TOTAL LPB The Total LPB is the LPB multiplied by the number of spaces.

3.2.3 Space Screen Cursor Control Keys

The keys described below allow cursor movement in the Space screen:

← moves the cursor one column to the left.

→ moves the cursor one column to the right. If at the last column, this key moves the cursor to the first column of the next row.

↑ moves the cursor up one row in the same column. If on the top row, this key scrolls the records down one row.

↓ moves the cursor down one row in the same column. If on the second to the last row, this key scrolls the records up three rows.

Ins inserts a blank record at the current cursor position.

Del deletes a record at the current cursor position.

PgUp moves the cursor up 17 records.

PgDn moves the cursor down 17 records.

Home moves the cursor to the first record.

3.2.4 Space Screen Function Keys

The function keys allow you to move to the other program screens, view and select space type codes, and access help messages.

F5 changes the display from the Space screen to the Controls screen.

F6 displays the space types and their descriptions in a menu. The menu will only be displayed if the cursor is in the Space Type field. Once the menu is displayed, move the cursor to the desired space type and press **Enter** to select it. Press **ESC** to return to the Space screen without making a selection.

You can search for a specific space type in the menu by pressing **F1**, entering a character string, and then pressing **Enter**. You may repeatedly press the **Space Bar** to search for other occurrences of the character string. A message will appear at the bottom of the screen when no more occurrences of the string can be found.

F7 displays a context-sensitive help message pertaining to the current field. Press any key to return to the Space screen.

F8 switches the display from the Space screen to the Main screen.

F10 is a 3-way toggle which changes the requirements calculated for the criteria from DOE 1989 values to DOE 1993 values to ASHRAE 90.1 values. Each version uses different table values for arriving at compliance requirements.

Ctrl-F10 copies the ceiling height on the line where the cursor is currently located to all other records containing data.

3.3 CONTROLS SCREEN

The standards encourages designers to efficiently control electric lighting. Use the Controls screen to record lighting controls for the proposed design and to assess their compliance with the standards.

In this section, the input values, calculated values, cursor control keys, and function keys for the Controls screen are described. The Controls screen is shown in Figure 3.4 without data. On this screen, enter information about the number of tasks or groups of tasks and the type(s) of control(s) installed in the space. The requirements for a minimum number of equivalent control points and the credits for various control types are described in

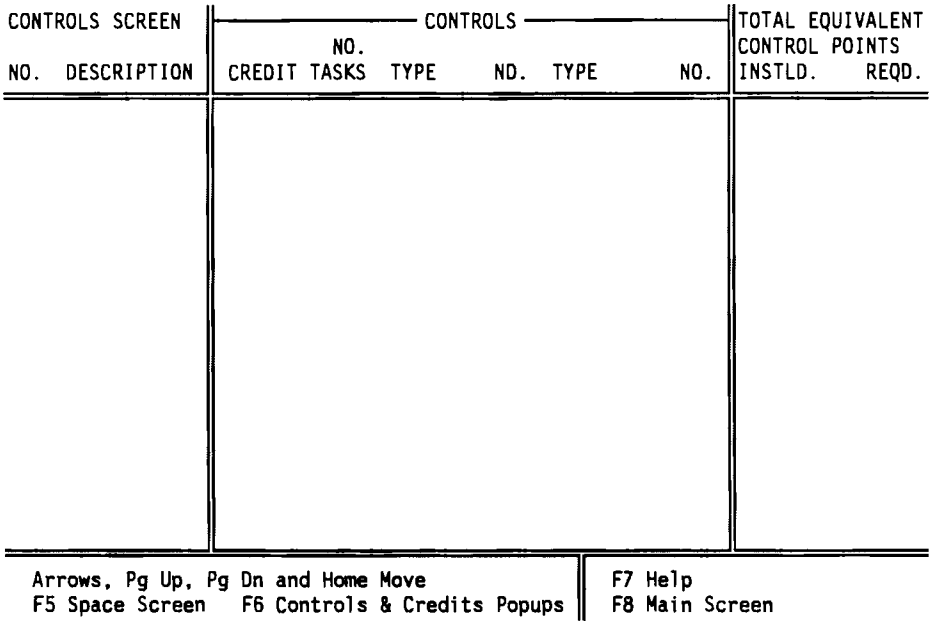

FIGURE 3.4. Controls Screen

Section 3.3.1 of the standards. The LTGSTD24 program automatically calculates the total control points required for each space, based on the data entered in the Space screen. Space numbers and descriptions are copied from the Space screen to the Controls screen.

3.3.1 Controls Screen Input Values

The following information is entered in the Controls screen:

NO. TASKS Enter the number of separate tasks or groups of tasks. The program uses the number of tasks to calculate the number of control points required for the space.

CONTROL TYPE Enter one of the following lighting system control type codes:

- 0 None
- M Manual
- O Occupancy Sensor
- T Programmer Timer
- 3 Three-Level
- 4 Four-Level
- A Automatic or Continuous Dimming.

The control type can be entered by typing the character code (shown above to the left of the descriptions) or by pressing **F6** to access a menu from which the controls can be selected. The program default is 0, no controls.

In the standards, there are discrepancies between Section 3.3.1 *Lighting Controls* and Section 3.5.6 *Lighting Power Control Credit and Power Adjustment Factor*. The terms used to describe different lighting control strategies are slightly different in Table 3.5-1, the lighting control equivalent point table and Table 3.5-2, the power adjustment factor (PAF) table. Table 3.5-2 is used in Equation 3.5-4, the lighting power control credit equation. The two sets of terms are listed here to show the correlation between the two.

Control Equivalence Points	PAF
Occupancy sensor	Occupancy sensor
Programmable timer	NA (not listed, no PAF given)
Three level	DS multiple step dimming
Four level	DS multiple step dimming
Automatic or continuous	DS continuous dimming
(not listed, no points given)	DS on/off
(not listed, no points given)	Lumen Maintenance

DS = Daylight Sensing

NO. CONTROLS Enter the number of controls installed in the space(s) for the control type entered in the column to the left. The program accepts values from 0 to 99. If the value from the Space screen for the number of spaces is greater than one, then the number of controls must be a multiple of the number of spaces. For example, if there are three spaces, then the number of controls of each type would have to be 3, 6, 9, or some other multiple of three.

CREDIT The standards allow a credit of watts in a space for the use of automatic controls. The Credit column displays the total credit earned for the space(s). The user must define the watts used for each control type. To define the watts, press the F6 key to access a window. The window will only be displayed if the cursor is in the Credit column. At the top of this window is the Lighting Power Budget (LPB) allowed in the space. There is also a list of five control strategies for the DOE version and 21 strategies for the ASHRAE version. The DOE standards do not allow extra credit for multicontrol systems as does the ASHRAE Standard. The DOE version allows credits for controls on fluorescent lighting only. If more than one space is defined, the final answer will be multiplied times the number of spaces.

For example, an 8 ft by 10 ft room uses 200 watts of fluorescent lamps with an occupancy sensor switch. The user would move the cursor to the Credit column, press F6, and move the cursor down to the Occupancy Sensor (OS) position and enter 200. The total number of watts listed would show in the bottom row of the window. The user would then press F10 to exit the window, and a 60 would appear in the Credit column. The total

of the Credit column is displayed on the main screen as the Lighting Power Control Credit (LPCC).

3.3.2 Controls Screen Calculated Values

The program calculates Total Equivalent Control Points for the number of controls installed and the number of controls required. The controls design complies if the number of installed points is greater than or equal to the number of required points.

INSTLD. This value is the equivalent control points for the number of controls installed in a given space. It is based on the Control Type and the Number of Controls defined by the user.

REQD. This value is the equivalent control points required for the space(s). It is based on the number of tasks, the area of the space and the total LPB. If multiple spaces have been defined on the Space screen, the requirement for a single space is multiplied by the number of spaces. Since this value is based on the total LPB instead of the actual installed wattage, the user should refer to Section 3.3.1.2 of the standards if a space is designed with more watts than the total LPB.

3.3.3 Controls Screen Cursor Control Keys

The keys described below allow cursor movement in the Controls screen:

← moves the cursor one column to the left. If at the first column, this key moves the cursor to the last column of the same row.

→ moves the cursor one column to the right. If at the last column, this key moves the cursor to the first column of the same row.

↑ moves the cursor up one row in the same column. If on the top row, this key scrolls the records down one row.

↓ moves the cursor down one row in the same column. If on the second to the last row, this key scrolls the records up three rows.

PgUp moves the cursor up 17 records.

PgDn moves the cursor down 17 records.

Home moves the cursor to the first record.

3.3.4 Controls Screen Function Keys

The function keys allow you to move to other program screens, view and select controls codes, and access help messages.

F5 switches the display from the Controls screen to the Space screen.

F6 displays the lighting control types and their descriptions in a menu. The menu will only be displayed if the cursor is in a controls type field. Once the menu is displayed, move the cursor to the desired control type and press **Enter** to select it. Press **ESC** to return to the Controls screen without making a selection.

F7 displays a context-sensitive help message for the current field. Press any key to return to the Controls screen.

F8 moves from the Controls screen to the Main screen.

3.4 EXTERIOR LIGHTING SCREEN

In this section, the input values, calculated values, cursor control keys, and function keys for the Exterior Lighting screen are described. The Exterior Lighting screen is shown in Figure 3.5 without data. On this screen, enter information about the building's exterior illumination areas in terms of area type and size. From this information, the program calculates the allowable lighting power densities based on Section 3.4 of the standards.

3.4.1 Exterior Lighting Screen Input Values

Up to 100 exterior illumination areas can be entered for each building. Data can be entered in any order, but incomplete records will not be included in the compliance calculations. This screen is used to calculate the Exterior Lighting Power Allowance on the Main screen.

AREA CODE Enter an integer from 1 to 13 to indicate the appropriate code for each illuminated exterior area. Alternatively, press **F6**, move the cursor to the appropriate area code, and press **Enter**. If the exterior area or activity is not represented in the menu, select the code with the most similar area or activity. The exterior area codes are listed in Table C.2.

AREA OR LENGTH Enter either the area or the length corresponding to the illuminated exterior area or surface. For exterior area codes 1, 2 and 6, the values are in linear feet. The values for

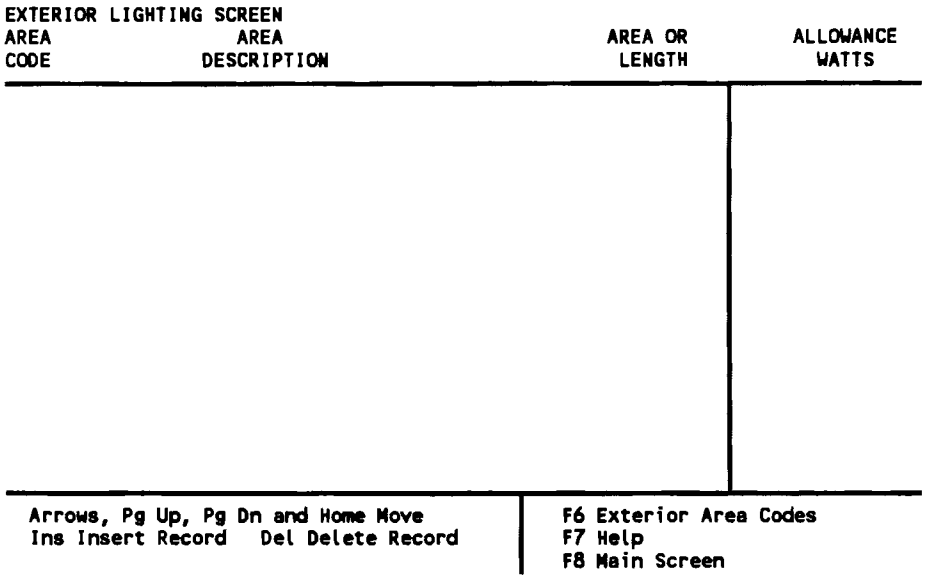

FIGURE 3.5. Exterior Lighting Screen

other area codes are in square feet. The program accepts values from 0 to 999,999,999. The program uses the area or length to calculate the allowance wattage for each exterior illumination area.

AREA CODE Enter an integer from 1 to 13 to indicate the appropriate code for each illuminated exterior area. Alternatively, press F6, move the cursor to the appropriate area code, and press Enter. If the exterior area or activity is not represented in the menu, select the code with the most similar area or activity. The exterior area codes are listed in Table C.2.

AREA OR LENGTH Enter either the area or the length corresponding to the illuminated exterior area or surface. For exterior area codes 1, 2 and 6, the values are in linear feet. The values for other area codes are in square feet. The program accepts values from 0 to 999,999,999. The program uses the area or length to calculate the allowance wattage for each exterior illumination area.

3.4.2 Exterior Lighting Screen Calculated Values

AREA DESCRIPTION When an area code is entered in the Area Code field, the program automatically supplies the area description. Alternatively, the area code and description can be selected together from a menu by pressing F6 while in the Area Code field.

ALLOWANCE WATTS The allowance watts calculation is based on the area of the chosen space and the Unit Power Density (UPD) for that type of space.

3.4.3 Exterior Lighting Screen Cursor Control Keys

The keys described below allow cursor movement in the Exterior Lighting screen:

← moves the cursor one column to the left.

→ moves the cursor one column to the right. If at the last column, this key moves the cursor to the first column of the same row.

↑ moves the cursor up one row in the same column. If on the top row, this key scrolls the records down one row.

↓ moves the cursor down one row in the same column. If on the second to the last row, this key scrolls the records up three rows.

Ins inserts a blank record at the current cursor position.

Del deletes a record at the current cursor position.

PgUp moves the cursor up 17 records.

PgDn moves the cursor down 17 records.

Home Moves the cursor to the first record.

3.4.4 Exterior Lighting Screen Function Keys

The function keys allow you to view and select exterior area codes and descriptions, access help messages, and return to the Main screen.

F6 displays the exterior area codes and descriptions in a menu. The menu will only be displayed if the cursor is in the Area Code field. Once the menu is displayed, move the cursor to the desired exterior area code and press **Enter** to select it. Press **ESC** to return to the Exterior Lighting screen without making a selection.

F7 displays a context-sensitive help message for the current field. Press any key to return to the Exterior Lighting screen.

F8 changes the display from the Exterior Lighting screen to the Main screen.

4.0 REFERENCES

10 CFR 435, Subpart A, January 30, 1989. U.S. Department of Energy, "Energy Conservation Voluntary Performance Standards for Commercial and Multi-Family High Rise Residential Buildings; Mandatory for New Federal Buildings; Interim Rule." Superintendent of Documents, U.S. Government Printing Office, Washington D.C.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE). 1985. *ASHRAE Handbook, 1985 Fundamentals Volume*. Atlanta, Georgia.

Energy Conservation and Production Act. August 14, 1976. Public Law 94-385, as amended, 42 USC 6831, 90 Stat 1144 et seq.

Hanlon, R.L., and L.M. Connell. 1993. *User's Guide for ENVSTD24 Program Version 2.4*. PNL-8616, Pacific Northwest Laboratory, Richland, Washington.

APPENDIX A

FILES CONTAINED ON PROGRAM DISKETTES

APPENDIX A

FILES CONTAINED ON THE PROGRAM DISKETTES

The LTGSTD24 program diskettes contain the following files:

- **LTGSTD24.EXE**, the Lighting Program
- **MEDOF24.LTG**, an example data file for a medium office building
- **APART24.LTG**, an example data file for a high-rise apartment building
- **BANK24.LTG**, an example data file for a single-story bank building.

APPENDIX B

EXAMPLE DATA FILES

APPENDIX B

EXAMPLE DATA FILES

To illustrate the data files produced using the LTGSTD24 program, three example files are included. **MEDOF24.LTG** contains data for a 48,664-ft^2 three-story office building orignally built in Farmington, Connecticut, in 1973. **APART24.LTG** contains data for a nine-story high-rise apartment building with 495,886 ft^2 orignally built in Edina, Minnesota, in 1977. **BANK24.LTG** contains data for a single-story branch bank building with 2,250 ft^2 originally built in Guilderland, New York.

MEDOF24.LTG

LIGHTING PRESCRIPTIVE AND SYSTEM PERFORMANCE COMPLIANCE CALCULATION PROGRAM
VERSION 2.4
VOLUNTARY PERFORMANCE STANDARDS FOR NEW COMMERCIAL AND MULTI-FAMILY
HIGH RISE RESIDENTIAL BUILDINGS; MANDATORY FOR FEDERAL BUILDINGS

BUILDING Medium Office
DATE September 1991 VERSION: DOE 1993

BUILDING TYPE	AREA
C Offices	48664 sq ft
NA	0 sq ft
NA	0 sq ft
	48664 Gross sq ft

BUILDING DESIGN:	CLP	-	LPCC	=	ALP	W/Gross sq ft
INTERIOR	64261 W	-	8241 W	=	56020 W	1.151
EXTERIOR	250 W					

PRESCRIPTIVE CRITERIA
Unit Lighting Power Allowance 1.220 W/Gross sq ft
Interior Lighting Power Allowance 59370 W

SYSTEM PERFORMANCE CRITERIA
Unit Power Density 1.322 W/Gross sq ft
Interior Lighting Power Allowance 64342 W

EXTERIOR LIGHTING CRITERIA
Exterior Lighting Power Allowance 250 W

****
CONTROLS: PASSES INTERIOR: PASSES SPC EXTERIOR: PASSES
****

SPACE DATA

TOTAL NO.	TYPE	DESCRIPTION	DIMENSIONS	AREA	HT	SPACES	CLG AF	CLG UPD	NO. LPB
1001	9	Kitchen		500	8.7	1	1.17	1.40	819
1002	45	Bulky Active Storage		84	8.7	1	1.69	0.30	43
1003	11	Active Traffic		160	8.7	2	1.42	0.60	273
1004	47	Material Handling		399	8.7	1	1.21	1.00	481
1005	38	Mail Room		216	8.7	1	1.33	1.80	518
1006	32	Reading, Typing & Fi		848	8.7	1	1.00	1.70	1442
1007	2	Corridor		416	8.7	1	1.00	0.80	333
1008	9	Kitchen		522	8.7	1	1.16	1.40	851
1009	6	Fast Food/Cafeteria		2030	8.7	1	1.03	0.80	1681
1010	12	Emergency Exit		189	8.7	1	1.37	0.40	104
1011	26	Reading, Typing & Fi		189	8.7	1	1.37	1.30	337

1012	45	Bulky Active Storage	294	8.7	1	1.26	0.30	111
1013	26	Reading, Typing & Fi	348	8.7	1	1.23	1.30	556
1014	16	Laboratory	400	8.7	1	1.20	2.20	1060
1015	21	Reception and Waitin	55	8.7	1	1.80	0.55	54
1016	34	Accounting	162	8.7	1	1.00	2.40	389
1017	44	Inactive Storage	55	8.7	1	1.80	0.20	20
1018	36	Computer/Office Equi	589	8.7	1	1.15	2.10	1420
1019	2	Corridor	192	8.7	1	1.00	0.80	154
1020	9	Kitchen	66	8.7	1	1.80	1.40	166
1021	13	Toilet and Washroom	144	8.7	3	1.46	0.50	314
1022	13	Toilet and Washroom	177	8.7	3	1.39	0.50	369
1023	44	Inactive Storage	60	8.7	1	1.80	0.20	22
1024	44	Inactive Storage	20	8.7	2	1.80	0.20	14
1025	21	Reception and Waitin	40	8.7	3	1.80	0.55	119
1027	7	Leisure Dining	30	8.7	3	1.80	1.40	227
1029	7	Leisure Dining	42	8.7	3	1.80	1.40	318
1030	21	Reception and Waitin	24	8.7	5	1.80	0.55	119
1031	25	Locker Room and Show	84	8.7	1	1.69	0.60	85
1032	2	Corridor	288	8.7	1	1.00	0.80	230
1034	25	Locker Room and Show	45	8.7	1	1.80	0.60	49
1035	2	Corridor	216	8.7	1	1.00	0.80	173
1036	3	Classroom/Lecture Ha	984	8.7	1	1.09	1.00	1073
1038	11	Active Traffic	18	8.7	1	1.80	0.60	19
1039	7	Leisure Dining	541	8.7	1	1.16	1.40	878
1040	45	Bulky Active Storage	64	8.7	1	1.80	0.30	35
1041	35	Conference/Meeting R	1062	8.7	1	1.08	1.30	1496
1042	16	Laboratory	1085	8.7	1	1.08	2.20	2582
1043	35	Conference/Meeting R	240	8.7	1	1.31	1.30	408
1044	32	Reading, Typing & Fi	280	8.7	9	1.00	1.70	4284
1045	27	Drafting	2804	8.7	1	1.02	2.20	6271
2002	32	Reading, Typing & Fi	168	8.7	24	1.00	1.70	6854
2003	11	Active Traffic	136	8.7	2	1.48	0.60	241
2004	32	Reading, Typing & Fi	156	8.7	4	1.00	1.70	1061
2006	2	Corridor	507	8.7	2	1.00	0.80	811
2012	26	Reading, Typing & Fi	2512	8.7	2	1.02	1.30	6678
2013	2	Corridor	60	8.7	2	1.00	0.80	96
2014	32	Reading, Typing & Fi	165	8.7	2	1.00	1.70	561
2015	32	Reading, Typing & Fi	180	8.7	2	1.00	1.70	612
2016	35	Conference/Meeting R	316	8.7	2	1.25	1.30	1025
2017	13	Toilet and Washroom	30	8.7	2	1.80	0.50	54
2018	70	Nurse Station	186	8.7	2	1.37	1.80	920
2019	2	Corridor	532	8.7	2	1.00	0.80	851
2022	32	Reading, Typing & Fi	252	8.7	2	1.00	1.70	857
2025	32	Reading, Typing & Fi	140	8.7	2	1.00	1.70	476
2026	46	Fine Active Storage	218	8.7	2	1.33	0.90	522
2027	25	Locker Room and Show	24	8.7	2	1.80	0.60	52
2028	2	Corridor	66	8.7	2	1.00	0.80	106
2029	32	Reading, Typing & Fi	36	8.7	2	1.00	1.70	122
2030	25	Locker Room and Show	30	8.7	2	1.80	0.60	65
2031	32	Reading, Typing & Fi	162	8.7	4	1.00	1.70	1102
2033	2	Corridor	126	8.7	2	1.00	0.80	202
2034	32	Reading, Typing & Fi	189	8.7	2	1.00	1.70	643
2035	32	Reading, Typing & Fi	150	8.7	2	1.00	1.70	510
2038	44	Inactive Storage	21	8.7	2	1.80	0.20	15
2039	25	Locker Room and Show	60	8.7	2	1.80	0.60	130
2040	21	Reception and Waitin	1024	8.7	2	1.09	0.55	1224
2041	35	Conference/Meeting R	86	8.7	2	1.68	1.30	375
2042	11	Active Traffic	144	8.7	2	1.46	0.60	251
2043	25	Locker Room and Show	35	8.7	2	1.80	0.60	76
2044	2	Corridor	232	8.7	2	1.00	0.80	371
2049	25	Locker Room and Show	168	8.7	2	1.40	0.60	283
2051	35	Conference/Meeting R	224	8.7	2	1.32	1.30	771
2054	35	Conference/Meeting R	280	8.7	2	1.27	1.30	926
2057	32	Reading, Typing & Fi	1351	8.7	2	1.00	1.70	4593

Total Designated Area 43608

CONTROL DATA

NO.	TYPE	DESCRIPTION	CREDIT	NO. TASKS	CONTROLS TYPE	NO.	CONTROLS TYPE	NO.	TOTAL EQUIV. CONTROL INST.	PTS. REQD.
1001	9	Kitchen	246	1	OCCUPANCY	1			2	2
1002	45	Bulky Active Storage	0	1	MANUAL	2			2	2
1003	11	Active Traffic	0	1	MANUAL	4			4	4
1004	47	Material Handling	0	1	MANUAL	2			2	2
1005	38	Mail Room	0	1	MANUAL	2			2	2
1006	32	Reading, Typing & Fi	0	1	MANUAL	2			2	2
1007	2	Corridor	0	1	MANUAL	2			2	2
1008	9	Kitchen	0	1	MANUAL	2			2	2
1009	6	Fast Food/Cafeteria	0	1	MANUAL	2			2	2
1010	12	Emergency Exit	0	1	MANUAL	2			2	2
1011	26	Reading, Typing & Fi	101	1	OCCUPANCY	1			2	2
1012	45	Bulky Active Storage	33	1	OCCUPANCY	1			2	2
1013	26	Reading, Typing & Fi	167	1	OCCUPANCY	1			2	2
1014	16	Laboratory	318	1	OCCUPANCY	1			2	2
1015	21	Reception and Waitin	16	1	OCCUPANCY	1			2	2
1016	34	Accounting	117	1	OCCUPANCY	1			2	2
1017	44	Inactive Storage	6	1	OCCUPANCY	1			2	2
1018	36	Computer/Office Equi	426	1	OCCUPANCY	1			2	2
1019	2	Corridor	46	1	OCCUPANCY	1			2	2
1020	9	Kitchen	50	1	OCCUPANCY	1			2	2
1021	13	Toilet and Washroom	0	1	MANUAL	6			6	6
1022	13	Toilet and Washroom	0	1	MANUAL	6			6	6
1023	44	Inactive Storage	0	1	MANUAL	2			2	2
1024	44	Inactive Storage	3	1	3 LEVEL	2			4	4
1025	21	Reception and Waitin	36	1	MANUAL	3	OCCUPANCY	3	9	6
1027	7	Leisure Dining	68	1	4 LEVEL	3			9	6
1029	7	Leisure Dining	0	1	MANUAL	6			6	6
1030	21	Reception and Waitin	0	1	MANUAL	10			10	10
1031	25	Locker Room and Show	0	1	MANUAL	2			2	2
1032	2	Corridor	0	1	MANUAL	2			2	2
1034	25	Locker Room and Show	0	1	MANUAL	2			2	2
1035	2	Corridor	52	1	OCCUPANCY	1			2	2
1036	3	Classroom/Lecture Ha	0	1	MANUAL	2			2	2
1038	11	Active Traffic	0	1	MANUAL	2			2	2
1039	7	Leisure Dining	0	1	MANUAL	2			2	2
1040	45	Bulky Active Storage	0	0	MANUAL	1			1	1
1041	35	Conference/Meeting R	0	1	MANUAL	2			2	2
1042	16	Laboratory	775	1	MANUAL	1	OCCUPANCY	1	3	2
1043	35	Conference/Meeting R	0	1	MANUAL	2			2	2
1044	32	Reading, Typing & Fi	0	1	MANUAL	18			18	18
1045	27	Drafting	1254	1	MANUAL	2	4 LEVEL	1	5	5
2002	32	Reading, Typing & Fi	0	1	MANUAL	48			48	48
2003	11	Active Traffic	72	1	OCCUPANCY	4			8	4
2004	32	Reading, Typing & Fi	318	1	OCCUPANCY	4			8	8
2006	2	Corridor	0	1	MANUAL	4			4	4
2012	26	Reading, Typing & Fi	2003	1	OCCUPANCY	2	MANUAL	2	6	6
2013	2	Corridor	0	1	MANUAL	4			4	4
2014	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2015	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2016	35	Conference/Meeting R	0	1	MANUAL	4			4	4
2017	13	Toilet and Washroom	0	1	MANUAL	4			4	4
2018	70	Nurse Station	276	1	AUTOMATIC	2			6	4
2019	2	Corridor	0	1	MANUAL	4			4	4
2022	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2025	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2026	46	Fine Active Storage	0	1	MANUAL	4			4	4
2027	25	Locker Room and Show	0	1	MANUAL	4			4	4
2028	2	Corridor	0	1	MANUAL	4			4	4
2029	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2030	25	Locker Room and Show	0	1	MANUAL	4			4	4
2031	32	Reading, Typing & Fi	0	1	MANUAL	8			8	8
2033	2	Corridor	0	1	MANUAL	4			4	4
2034	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2035	32	Reading, Typing & Fi	0	1	MANUAL	4			4	4
2038	44	Inactive Storage	0	1	MANUAL	4			4	4
2039	25	Locker Room and Show	0	1	MANUAL	4			4	4
2040	21	Reception and Waitin	367	1	AUTOMATIC	2			6	4
2041	35	Conference/Meeting R	113	1	MANUAL	2	OCCUPANCY	2	6	4

2042	11 Active Traffic	0	3	MANUAL	4	4	4
2043	25 Locker Room and Show	0	1	MANUAL	4	4	4
2044	2 Corridor	0	2	MANUAL	4	4	4
2049	25 Locker Room and Show	0	2	MANUAL	4	4	4
2051	35 Conference/Meeting R	0	1	MANUAL	4	4	4
2054	35 Conference/Meeting R	0	2	MANUAL	4	4	4
2057	32 Reading, Typing & Fi	1378	1	AUTOMATIC	2	6	4

EXTERIOR LIGHTING DATA

AREA CODE	AREA DESCRIPTION	AREA OR LENGTH	ALLOWANCE WATTS
1	Exit (with or without canopy)	10.00 ft	250.00

CONTROL WATTS PER SPACE

NO.	TYPE DESCRIPTION control type	watts
1001	9 Kitchen OCCUPANCY SENSOR (OS)	819
1011	26 Reading, Typing & Fi OCCUPANCY SENSOR (OS)	337
1012	45 Bulky Active Storage OCCUPANCY SENSOR (OS)	111
1013	26 Reading, Typing & Fi OCCUPANCY SENSOR (OS)	556
1014	16 Laboratory OCCUPANCY SENSOR (OS)	1060
1015	21 Reception and Waitin OCCUPANCY SENSOR (OS)	54
1016	34 Accounting OCCUPANCY SENSOR (OS)	389
1017	44 Inactive Storage OCCUPANCY SENSOR (OS)	20
1018	36 Computer/Office Equi OCCUPANCY SENSOR (OS)	1420
1019	2 Corridor OCCUPANCY SENSOR (OS)	154
1020	9 Kitchen OCCUPANCY SENSOR (OS)	166
1024	44 Inactive Storage DS/MULTI STEP (DS/MS)	7
1025	21 Reception and Waitin OCCUPANCY SENSOR (OS)	40
1027	7 Leisure Dining OCCUPANCY SENSOR (OS)	76
1035	2 Corridor OCCUPANCY SENSOR (OS)	173
1042	16 Laboratory OCCUPANCY SENSOR (OS)	2582

1045	27 Drafting	
	DS/MULTI STEP (DS/MS)	6271
2003	11 Active Traffic	
	OCCUPANCY SENSOR (OS)	120
2004	32 Reading, Typing & Fi	
	OCCUPANCY SENSOR (OS)	265
2012	26 Reading, Typing & Fi	
	OCCUPANCY SENSOR (OS)	3339
2018	70 Nurse Station	
	DS/CONTINUOUS DIM (DS/CD)	460
2040	21 Reception and Waitin	
	DS/CONTINUOUS DIM (DS/CD)	612
2041	35 Conference/Meeting R	
	OCCUPANCY SENSOR (OS)	188
2057	32 Reading, Typing & Fi	
	DS/CONTINUOUS DIM (DS/CD)	2297

APART24.LTG

LIGHTING PRESCRIPTIVE AND SYSTEM PERFORMANCE COMPLIANCE CALCULATION PROGRAM
VERSION 2.4
VOLUNTARY PERFORMANCE STANDARDS FOR NEW COMMERCIAL AND MULTI-FAMILY
HIGH RISE RESIDENTIAL BUILDINGS; MANDATORY FOR FEDERAL BUILDINGS

BUILDING Apartment
DATE September 1991 VERSION: DOE 1993

BUILDING TYPE	AREA
NA	495886 sq ft
NA	0 sq ft
NA	0 sq ft
	495886 Gross sq ft

BUILDING DESIGN:	CLP	-	LPCC	=	ALP	W/Gross sq ft
INTERIOR	208731 W	-	50393 W	=	158338 W	0.319
EXTERIOR	2800 W					

PRESCRIPTIVE CRITERIA
Unit Lighting Power Allowance NA W/Gross sq ft
Interior Lighting Power Allowance NA W

SYSTEM PERFORMANCE CRITERIA
Unit Power Density 0.421 W/Gross sq ft
Interior Lighting Power Allowance 208732 W

EXTERIOR LIGHTING CRITERIA
Exterior Lighting Power Allowance 2885 W

****
CONTROLS: PASSES INTERIOR: PASSES SPC EXTERIOR: PASSES
****

SPACE DATA

NO.	TYPE	DESCRIPTION	DIMENSIONS	AREA	CLG HT	NO. SPACES	AF	UPD	TOTAL LPB
1101	11	Active Traffic		151	9.0	2	1.47	0.60	267
1102	21	Reception and Waitin		53	9.0	2	1.80	0.55	105
1103	2	Corridor		280	9.0	1	1.00	0.80	224
1104	21	Reception and Waitin		466	9.0	1	1.20	0.55	306
1105	44	Inactive Storage		58	9.0	1	1.80	0.20	21
1106	2	Corridor		458	9.0	1	1.00	0.80	366
1107	8	Bar/Lounge		120	9.0	1	1.56	1.30	244
1108	35	Conference/Meeting R		216	9.0	1	1.36	1.30	382
1109	26	Reading, Typing & Fi		168	9.0	2	1.43	1.30	627
1111	2	Corridor		140	9.0	1	1.00	0.80	112
1112	44	Inactive Storage		24	9.0	1	1.80	0.20	9

1113	13	Toilet and Washroom	70	9.0	1	1.80	0.50	63
1114	26	Reading, Typing & Fi	114	9.0	1	1.55	1.30	230
1201	21	Reception and Waitin	30	9.0	1	1.80	0.55	30
1202	11	Active Traffic	166	9.0	1	1.44	0.60	143
1203	2	Corridor	326	9.0	1	1.00	0.80	261
1204	2	Corridor	655	9.0	1	1.00	0.80	524
1205	4	General	184	9.0	1	1.00	0.70	129
1206	26	Reading, Typing & Fi	340	9.0	1	1.25	1.30	553
1207	2	Corridor	136	9.0	1	1.00	0.80	109
1208	45	Bulky Active Storage	96	9.0	1	1.67	0.30	48
1209	38	Mail Room	160	9.0	1	1.45	1.80	418
1210	21	Reception and Waitin	308	9.0	1	1.27	0.55	216
1211	86	Washing	124	9.0	1	1.55	0.60	115
1213	4	General	426	9.0	1	1.00	0.70	298
1214	2	Corridor	229	9.0	1	1.00	0.80	183
1215	45	Bulky Active Storage	146	9.0	1	1.48	0.30	65
1216	88	General Exhibition	1856	9.0	1	1.05	1.20	2332
1217	2	Corridor	248	9.0	1	1.00	0.80	198
1218	13	Toilet and Washroom	221	9.0	2	1.35	0.50	299
1220	85	Reception Desk	2267	9.0	1	1.03	2.40	5625
1221	84	Lobby	63	9.0	2	1.80	1.30	295
1222	84	Lobby	874	9.0	1	1.11	1.30	1264
1223	26	Reading, Typing & Fi	81	9.0	1	1.55	1.30	163
1301	21	Reception and Waitin	35	9.0	1	1.80	0.55	35
1302	2	Corridor	463	9.0	1	1.00	0.80	370
1303	2	Corridor	477	9.0	1	1.00	0.80	382
1304	4	General	208	9.0	1	1.00	0.70	146
1305	45	Bulky Active Storage	128	9.0	2	1.54	0.30	118
1306	21	Reception and Waitin	874	9.0	1	1.11	0.55	535
1309	9	Kitchen	436	9.0	1	1.21	1.40	736
1310	9	Kitchen	238	9.0	1	1.33	1.40	444
1311	9	Kitchen	711	9.0	1	1.14	1.40	1131
1312	9	Kitchen	168	9.0	1	1.43	1.40	337
1313	2	Corridor	42	9.0	1	1.00	0.80	34
1314	11	Active Traffic	159	9.0	1	1.45	0.60	139
1315	13	Toilet and Washroom	45	9.0	2	1.80	0.50	81
1317	6	Fast Food/Cafeteria	1274	9.0	1	1.08	0.80	1096
1318	6	Fast Food/Cafeteria	2683	9.0	1	1.02	0.80	2198
1319	21	Reception and Waitin	112	9.0	1	1.59	0.55	98
1320	45	Bulky Active Storage	105	9.0	1	1.62	0.30	51
1321	11	Active Traffic	168	9.0	1	1.43	0.60	145
1322	84	Lobby	552	9.0	1	1.17	1.30	839
1403	2	Corridor	301	9.0	1	1.00	0.80	241
1404	21	Reception and Waitin	538	9.0	1	1.17	0.55	347
1405	44	Inactive Storage	55	9.0	1	1.80	0.20	20
1406	2	Corridor	450	9.0	1	1.00	0.80	360
1407	2	Corridor	80	9.0	1	1.00	0.80	64
1408	8	Bar/Lounge	732	9.0	1	1.13	1.30	1078
1409	4	General	16	9.0	1	1.00	0.70	11
1410	2	Corridor	16	9.0	2	1.00	0.80	26
1411	86	Washing	144	9.0	1	1.49	0.60	129
1412	13	Toilet and Washroom	84	9.0	2	1.74	0.50	147
1413	6	Fast Food/Cafeteria	70	9.0	1	1.80	0.80	101
1416	10	Recreation/Lounge	224	9.0	1	1.35	0.50	151
1417	10	Recreation/Lounge	448	9.0	1	1.20	0.50	269
1418	13	Toilet and Washroom	42	9.0	1	1.80	0.50	38
1419	13	Toilet and Washroom	56	9.0	1	1.80	0.50	50
1420	2	Corridor	230	9.0	1	1.00	0.80	184
1421	21	Reception and Waitin	63	9.0	1	1.80	0.55	62
1422	8	Bar/Lounge	84	9.0	1	1.74	1.30	190
1423	25	Locker Room and Show	168	9.0	1	1.43	0.60	145
1424	8	Bar/Lounge	1384	9.0	1	1.07	1.30	1923
2101	11	Active Traffic	168	8.0	4	1.34	0.60	539
2102	2	Corridor	305	8.0	1	1.00	0.80	244
2103	21	Reception and Waitin	455	8.0	1	1.15	0.55	288
2104	44	Inactive Storage	63	8.0	2	1.72	0.20	43
2105	2	Corridor	446	8.0	2	1.00	0.80	714
2202	2	Corridor	275	8.0	1	1.00	0.80	220
2203	2	Corridor	65	8.0	1	1.00	0.80	52
2204	44	Inactive Storage	608	8.0	1	1.12	0.20	136
2205	2	Corridor	684	8.0	1	1.00	0.80	547
2206	45	Bulky Active Storage	81	8.0	2	1.59	0.30	77
2207	4	General	60	8.0	1	1.00	0.70	42

2208	32	Reading, Typing & Fi	782	8.0	1	1.00	1.70	1329
2209	21	Reception and Waitin	1420	8.0	1	1.04	0.55	814
2210	10	Recreation/Lounge	360	8.0	1	1.18	0.50	213
2211	20	Reading Area	504	8.0	1	1.14	1.00	573
2212	26	Reading, Typing & Fi	143	8.0	1	1.38	1.30	257
2213	86	Washing	260	8.0	1	1.24	0.60	193
2214	26	Reading, Typing & Fi	194	8.0	1	1.30	1.30	328
2302	2	Corridor	431	8.0	1	1.00	0.80	345
2303	2	Corridor	210	8.0	1	1.00	0.80	168
2304	2	Corridor	363	8.0	1	1.00	0.80	290
2305	44	Inactive Storage	416	8.0	1	1.16	0.20	97
2306	4	General	252	8.0	1	1.00	0.70	176
2307	45	Bulky Active Storage	96	8.0	1	1.52	0.30	44
2308	21	Reception and Waitin	948	8.0	1	1.07	0.55	559
2309	2	Corridor	48	8.0	1	1.00	0.80	38
2310	86	Washing	160	8.0	1	1.35	0.60	130
2311	4	General	56	8.0	1	1.00	0.70	39
2312	13	Toilet and Washroom	42	8.0	2	1.80	0.50	76
2314	21	Reception and Waitin	126	8.0	1	1.42	0.55	98
2316	4	General	72	8.0	1	1.00	0.70	50
2317	25	Locker Room and Show	91	8.0	2	1.54	0.60	168
2318	13	Toilet and Washroom	112	8.0	2	1.46	0.50	163
2319	25	Locker Room and Show	28	8.0	2	1.80	0.60	60
2323	71	Occu./Physical Thera	1016	8.0	1	1.07	1.40	1517
2324	45	Bulky Active Storage	144	8.0	1	1.38	0.30	60
2325	2	Corridor	130	8.0	1	1.00	0.80	104
2326	9	Kitchen	574	8.0	1	1.12	1.40	901
2327	8	Bar/Lounge	448	8.0	1	1.15	1.30	671
2328	8	Bar/Lounge	306	8.0	1	1.21	1.30	481
2402	2	Corridor	310	8.0	1	1.00	0.80	248
2403	21	Reception and Waitin	535	8.0	1	1.13	0.55	332
5000	23	Atrium First 3 Floor	362736	8.0	1	1.00	0.40	145094
6000	14	Auto and Pedestrian	23760	8.0	1	1.00	0.25	5940
6001	15	Parking Area	55440	8.0	1	1.00	0.20	11088
		Total Designated Area	483336					

CONTROL DATA

					CONTROLS			TOTAL EQUIV. CONTROL PTS.	
NO.	TYPE	DESCRIPTION	CREDIT	NO. TASKS	TYPE	NO.	TYPE	NO. INST.	REQD.
1101	11	Active Traffic	0	1	MANUAL	4		4	4
1102	21	Reception and Waitin	0	1	MANUAL	4		4	4
1103	2	Corridor	0	1	MANUAL	2		2	2
1104	21	Reception and Waitin	0	1	MANUAL	2		2	2
1105	44	Inactive Storage	0	0	MANUAL	1		1	1
1106	2	Corridor	110	1	AUTOMATIC	1		3	2
1107	8	Bar/Lounge	73	1	AUTOMATIC	1		3	2
1108	35	Conference/Meeting R	0	1	MANUAL	2		2	2
1109	26	Reading, Typing & Fi	0	1	MANUAL	4		4	4
1111	2	Corridor	34	1	AUTOMATIC	1		3	2
1112	44	Inactive Storage	0	0	MANUAL	1		1	1
1113	13	Toilet and Washroom	0	1	MANUAL	2		2	2
1114	26	Reading, Typing & Fi	0	1	MANUAL	2		2	2
1201	21	Reception and Waitin	0	1	MANUAL	2		2	2
1202	11	Active Traffic	0	1	MANUAL	2		2	2
1203	2	Corridor	78	1	AUTOMATIC	1		3	2
1204	2	Corridor	157	1	AUTOMATIC	1		3	2
1205	4	General	0	1	MANUAL	2		2	2
1206	26	Reading, Typing & Fi	0	1	MANUAL	2		2	2
1207	2	Corridor	33	1	AUTOMATIC	1		3	2
1208	45	Bulky Active Storage	0	1	MANUAL	2		2	2
1209	38	Mail Room	0	1	MANUAL	2		2	2
1210	21	Reception and Waitin	0	1	MANUAL	2		2	2
1211	86	Washing	0	1	MANUAL	2		2	2
1213	4	General	0	1	MANUAL	2		2	2
1214	2	Corridor	0	1	MANUAL	2		2	2
1215	45	Bulky Active Storage	0	1	MANUAL	2		2	2
1216	88	General Exhibition	0	1	MANUAL	3		3	2
1217	2	Corridor	59	1	AUTOMATIC	1		3	2
1218	13	Toilet and Washroom	89	1	AUTOMATIC	2		6	4

1220	85	Reception Desk	0	1	MANUAL	4			4	4
1221	84	Lobby	0	1	MANUAL	4			4	4
1222	84	Lobby	0	1	MANUAL	2			2	2
1223	26	Reading, Typing & Fi	0	1	MANUAL	2			2	2
1301	21	Reception and Waitin	0	1	MANUAL	2			2	2
1302	2	Corridor	111	1	AUTOMATIC	1			3	2
1303	2	Corridor	115	1	AUTOMATIC	1			3	2
1304	4	General	0	1	MANUAL	2			2	2
1305	45	Bulky Active Storage	0	1	MANUAL	4			4	4
1306	21	Reception and Waitin	0	1	MANUAL	2			2	2
1309	9	Kitchen	221	1	OCCUPANCY	1			2	2
1310	9	Kitchen	133	1	OCCUPANCY	1			2	2
1311	9	Kitchen	339	1	OCCUPANCY	1			2	2
1312	9	Kitchen	101	1	OCCUPANCY	1			2	2
1313	2	Corridor	10	1	AUTOMATIC	1			3	2
1314	11	Active Traffic	0	1	MANUAL	2			2	2
1315	13	Toilet and Washroom	0	1	MANUAL	4			4	4
1317	6	Fast Food/Cafeteria	329	1	OCCUPANCY	1			2	2
1318	6	Fast Food/Cafeteria	659	1	OCCUPANCY	1	MANUAL	1	3	2
1319	21	Reception and Waitin	0	1	MANUAL	2			2	2
1320	45	Bulky Active Storage	0	1	MANUAL	2			2	2
1321	11	Active Traffic	0	1	MANUAL	2			2	2
1322	84	Lobby	0	1	MANUAL	2			2	2
1403	2	Corridor	0	1	MANUAL	2			2	2
1404	21	Reception and Waitin	0	1	MANUAL	2			2	2
1405	44	Inactive Storage	0	0	MANUAL	1			1	1
1406	2	Corridor	108	1	AUTOMATIC	1			3	2
1407	2	Corridor	19	1	AUTOMATIC	1			3	2
1408	8	Bar/Lounge	0	1	MANUAL	2			2	2
1409	4	General	0	1	MANUAL	2			2	2
1410	2	Corridor	8	1	AUTOMATIC	2			6	4
1411	86	Washing	0	1	MANUAL	2			2	2
1412	13	Toilet and Washroom	0	1	MANUAL	4			4	4
1413	6	Fast Food/Cafeteria	0	1	MANUAL	2			2	2
1416	10	Recreation/Lounge	0	1	MANUAL	2			2	2
1417	10	Recreation/Lounge	0	1	MANUAL	2			2	2
1418	13	Toilet and Washroom	0	1	MANUAL	2			2	2
1419	13	Toilet and Washroom	0	1	MANUAL	2			2	2
1420	2	Corridor	55	1	AUTOMATIC	1			3	2
1421	21	Reception and Waitin	0	1	MANUAL	2			2	2
1422	8	Bar/Lounge	0	1	MANUAL	2			2	2
1423	25	Locker Room and Show	0	1	MANUAL	2			2	2
1424	8	Bar/Lounge	577	1	MANUAL	1	OCCUPANCY	1	3	2
2101	11	Active Traffic	0	1	MANUAL	8			8	8
2102	2	Corridor	73	1	AUTOMATIC	1			3	2
2103	21	Reception and Waitin	0	1	MANUAL	2			2	2
2104	44	Inactive Storage	0	1	MANUAL	4			4	4
2105	2	Corridor	214	1	AUTOMATIC	2			6	4
2202	2	Corridor	66	1	AUTOMATIC	1			3	2
2203	2	Corridor	16	1	AUTOMATIC	1			3	2
2204	44	Inactive Storage	0	0	MANUAL	1			1	1
2205	2	Corridor	164	1	AUTOMATIC	1			3	2
2206	45	Bulky Active Storage	0	1	MANUAL	4			4	4
2207	4	General	0	1	MANUAL	2			2	2
2208	32	Reading, Typing & Fi	0	1	MANUAL	2			2	2
2209	21	Reception and Waitin	0	1	MANUAL	2			2	2
2210	10	Recreation/Lounge	0	1	MANUAL	2			2	2
2211	20	Reading Area	0	1	MANUAL	2			2	2
2212	26	Reading, Typing & Fi	0	1	MANUAL	2			2	2
2213	86	Washing	0	1	MANUAL	2			2	2
2214	26	Reading, Typing & Fi	0	1	MANUAL	2			2	2
2302	2	Corridor	104	1	AUTOMATIC	1			3	2
2303	2	Corridor	50	1	AUTOMATIC	1			3	2
2304	2	Corridor	87	1	AUTOMATIC	1			3	2
2305	44	Inactive Storage	0	0	MANUAL	1			1	1
2306	4	General	0	1	MANUAL	2			2	2
2307	45	Bulky Active Storage	0	1	MANUAL	2			2	2
2308	21	Reception and Waitin	0	1	MANUAL	2			2	2
2309	2	Corridor	11	1	AUTOMATIC	1			3	2
2310	86	Washing	0	1	MANUAL	2			2	2
2311	4	General	0	1	MANUAL	2			2	2
2312	13	Toilet and Washroom	0	1	MANUAL	4			4	4
2314	21	Reception and Waitin	0	1	MANUAL	2			2	2

2316	4	General	0	1	MANUAL	2			2	2
2317	25	Locker Room and Show	0	1	MANUAL	4			4	4
2318	13	Toilet and Washroom	0	1	MANUAL	4			4	4
2319	25	Locker Room and Show	0	1	MANUAL	4			4	4
2323	71	Occu./Physical Thera	0	1	MANUAL	2			2	2
2324	45	Bulky Active Storage	0	1	MANUAL	2			2	2
2325	2	Corridor	31	1	AUTOMATIC	2			6	2
2326	9	Kitchen	0	1	MANUAL	2			2	2
2327	8	Bar/Lounge	0	1	MANUAL	2			2	2
2328	8	Bar/Lounge	0	1	MANUAL	2			2	2
2402	2	Corridor	74	1	AUTOMATIC	1			3	2
2403	21	Reception and Waitin	0	1	MANUAL	2			2	2
5000	23	Atrium First 3 Floor	43528	1	4 LEVEL	27	AUTOMATIC	30	171	97
6000	14	Auto and Pedestrian	891	1	TIMER	3			6	4
6001	15	Parking Area	1663	1	TIMER	4			8	8

EXTERIOR LIGHTING DATA

AREA CODE	AREA DESCRIPTION	AREA OR LENGTH	ALLOWANCE WATTS
4	Entrance (with canopy) light traffic	240.00 sq ft	960.00
1	Exit (with or without canopy)	48.00 ft	1200.00
12	Private parking lots	5000.00 sq ft	600.00
7	Building exterior surfaces/facades	500.00 sq ft	125.00

CONTROL WATTS PER SPACE

NO.	TYPE DESCRIPTION control type	watts
1106	2 Corridor DS/CONTINUOUS DIM (DS/CD)	366
1107	8 Bar/Lounge DS/CONTINUOUS DIM (DS/CD)	244
1111	2 Corridor DS/CONTINUOUS DIM (DS/CD)	112
1203	2 Corridor DS/CONTINUOUS DIM (DS/CD)	261
1204	2 Corridor DS/CONTINUOUS DIM (DS/CD)	524
1207	2 Corridor DS/CONTINUOUS DIM (DS/CD)	109
1217	2 Corridor DS/CONTINUOUS DIM (DS/CD)	198
1218	13 Toilet and Washroom DS/CONTINUOUS DIM (DS/CD)	149
1302	2 Corridor DS/CONTINUOUS DIM (DS/CD)	370
1303	2 Corridor DS/CONTINUOUS DIM (DS/CD)	382
1309	9 Kitchen OCCUPANCY SENSOR (OS)	736
1310	9 Kitchen OCCUPANCY SENSOR (OS)	444
1311	9 Kitchen	

	OCCUPANCY SENSOR (OS)	1131
1312	9 Kitchen	
	OCCUPANCY SENSOR (OS)	337
1313	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	34
1317	6 Fast Food/Cafeteria	
	OCCUPANCY SENSOR (OS)	1096
1318	6 Fast Food/Cafeteria	
	OCCUPANCY SENSOR (OS)	2198
1406	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	360
1407	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	64
1410	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	13
1420	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	184
1424	8 Bar/Lounge	
	OCCUPANCY SENSOR (OS)	1923
2102	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	244
2105	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	357
2202	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	220
2203	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	52
2205	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	547
2302	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	345
2303	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	168
2304	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	290
2309	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	38
2325	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	104
2402	2 Corridor	
	DS/CONTINUOUS DIM (DS/CD)	248
5000	23 Atrium First 3 Floor	
	DS/CONTINUOUS DIM (DS/CD)	145094
6000	14 Auto and Pedestrian	
	PROGRAMMABLE TIMER (PT)	5940
6001	15 Parking Area	
	PROGRAMMABLE TIMER (PT)	11088

BANK24.LTG

LIGHTING PRESCRIPTIVE AND SYSTEM PERFORMANCE COMPLIANCE CALCULATION PROGRAM
VERSION 2.4
VOLUNTARY PERFORMANCE STANDARDS FOR NEW COMMERCIAL AND MULTI-FAMILY
HIGH RISE RESIDENTIAL BUILDINGS; MANDATORY FOR FEDERAL BUILDINGS

BUILDING Branch Bank
DATE September 1992 VERSION: DOE 1993

BUILDING TYPE	AREA
C Offices	2250 sq ft
NA	0 sq ft
NA	0 sq ft
	2250 Gross sq ft

BUILDING DESIGN:	CLP	-	LPCC	=	ALP	W/Gross sq ft
INTERIOR	3597 W	-	549 W	=	3048 W	1.355
EXTERIOR	200 W					

PRESCRIPTIVE CRITERIA
Unit Lighting Power Allowance 1.340 W/Gross sq ft
Interior Lighting Power Allowance 3015 W

SYSTEM PERFORMANCE CRITERIA
Unit Power Density 1.599 W/Gross sq ft
Interior Lighting Power Allowance 3598 W

EXTERIOR LIGHTING CRITERIA
Exterior Lighting Power Allowance 250 W

****
CONTROLS: PASSES INTERIOR: PASSES SPC EXTERIOR: PASSES
****

SPACE DATA

NO.	TYPE	DESCRIPTION	DIMENSIONS	AREA	CLG HT	NO. SPACES	AF	UPD	TOTAL LPB
1101	21	Reception and Waitin		48	10.0	1	1.80	0.55	48
1102	7	Leisure Dining		109	10.0	1	1.76	1.40	268
1103	9	Kitchen		176	10.0	1	1.52	1.40	375
1104	13	Toilet and Washroom		45	10.0	1	1.80	0.50	41
1105	2	Corridor		60	10.0	1	1.00	0.80	48
1106	13	Toilet and Washroom		60	10.0	1	1.80	0.50	54
1107	35	Conference/Meeting R		160	10.0	1	1.56	1.30	325
1108	26	Reading, Typing & Fi		198	10.0	1	1.48	1.30	380
1110	44	Inactive Storage		99	10.0	1	1.80	0.20	36
1111	44	Inactive Storage		15	10.0	2	1.80	0.20	11
1113	26	Reading, Typing & Fi		80	10.0	1	1.55	1.30	161

1114	54	Banking Activity Are	240	10.0	1	1.41	2.20	746
1115	44	Inactive Storage	52	10.0	1	1.80	0.20	19
1116	26	Reading, Typing & Fi	680	10.0	1	1.18	1.30	1044

Total Designated Area 2037

CONTROL DATA

NO.	TYPE	DESCRIPTION	CREDIT	NO. TASKS	CONTROLS TYPE	NO.	TYPE	NO.	TOTAL EQUIV. CONTROL INST.	PTS. REQD.
1101	21	Reception and Waitin	14	1	OCCUPANCY	1			2	2
1102	7	Leisure Dining	80	1	OCCUPANCY	1			2	2
1103	9	Kitchen	113	2	OCCUPANCY	1			2	2
1104	13	Toilet and Washroom	12	1	OCCUPANCY	1			2	2
1105	2	Corridor	7	1	TIMER	1			2	2
1106	13	Toilet and Washroom	16	1	OCCUPANCY	1			2	2
1107	35	Conference/Meeting R	98	1	OCCUPANCY	1			2	2
1108	26	Reading, Typing & Fi	0	3	MANUAL	2			2	2
1110	44	Inactive Storage	0	1	MANUAL	2			2	2
1111	44	Inactive Storage	0	1	MANUAL	4			4	4
1113	26	Reading, Typing & Fi	0	1	MANUAL	2			2	2
1114	54	Banking Activity Are	0	6	MANUAL	2			2	2
1115	44	Inactive Storage	0	1	MANUAL	2			2	2
1116	26	Reading, Typing & Fi	209	10		3	LEVEL	2	4	3

EXTERIOR LIGHTING DATA

AREA CODE	AREA DESCRIPTION	AREA OR LENGTH	ALLOWANCE WATTS
1	Exit (with or without canopy)	10.00 ft	250.00

CONTROL WATTS PER SPACE

NO.	TYPE	DESCRIPTION control type	watts
1101	21	Reception and Waitin OCCUPANCY SENSOR (OS)	48
1102	7	Leisure Dining OCCUPANCY SENSOR (OS)	268
1103	9	Kitchen OCCUPANCY SENSOR (OS)	375
1104	13	Toilet and Washroom OCCUPANCY SENSOR (OS)	41
1105	2	Corridor PROGRAMMABLE TIMER (PT)	48
1106	13	Toilet and Washroom OCCUPANCY SENSOR (OS)	54
1107	35	Conference/Meeting R OCCUPANCY SENSOR (OS)	325
1116	26	Reading, Typing & Fi DS/MULTI STEP (DS/MS)	1044

APPENDIX C

BUILDING TYPE, EXTERIOR AREA, AND SPACE TYPE CODES

APPENDIX C

BUILDING TYPE, EXTERIOR AREA, AND SPACE TYPE CODES

This appendix lists the building type, exterior area, and space type codes incorporated into the LTGSTD24 program.

Building type codes are based on the list of building occupancies/types in Table 3.4-1 of the standards. Table C.1 lists the building type codes with the corresponding unit lighting power allowance (ULPA) values for both 1989 and 1993.

The exterior type codes are based on the list of roads, grounds, and other exterior illumination areas in Table 3.4-2 of the standards. Table C.2 lists the exterior type codes with their corresponding UPD values.

The space type codes are based on the list of spaces/functions in Table 3.4-1 of the standards. The UPD values shown for each space type have also been incorporated directly into the program. Table C.3 lists the space type codes for various space functions with their corresponding UPD values for 1989 and 1993.

TABLE C.1. Building Type Codes

Type Effective Code	Building Type	Prescriptive Unit Lighting Power Allowance (ULPA), W/ft² for Gross Lighted Area Ranges						
		0 to 2,000 ft²	2,001 to 10,000 ft²	10,001 to 25,000 ft²	25,001 to 50,000 ft²	50,001 to 250,000 ft²	>250,000 ft²	Date
A	Fast Food/Cafeteria	1.50	1.38	1.34	1.32	1.31	1.30	1989
		0.92	0.85	0.82	0.81	0.81	0.80	1993
B	Leisure Dining/Bar	2.20	1.91	1.71	1.56	1.46	1.40	1989
		1.60	1.56	1.52	1.48	1.44	1.40	1993
C	Offices	1.90	1.81	1.72	1.65	1.57	1.50	1989
		1.40	1.34	1.27	1.22	1.16	1.11	1993
D	Retail	3.30	3.08	2.83	2.50	2.28	2.10	1989
		2.70	2.52	2.32	2.05	1.87	1.72	1993
E	Mall Concourse	1.60	1.58	1.52	1.46	1.43	1.40	1989
		0.69	0.68	0.65	0.63	0.61	0.60	1993
F	Service Establishment	2.70	2.37	2.08	1.92	1.80	1.70	1989
		2.81	2.03	1.78	1.65	1.54	1.46	1993
G	Garage	0.30	0.28	0.24	0.22	0.21	0.20	1989
		0.25	0.24	0.23	0.22	0.21	0.20	1993
H	Pre/Elementary School	1.80	1.80	1.72	1.65	1.57	1.50	1989
		1.33	1.33	1.27	1.22	1.16	1.11	1993
I	High School	1.90	1.90	1.88	1.83	1.76	1.70	1989
		1.40	1.40	1.39	1.35	1.30	1.26	1993
J	Technical/Voc. School	2.40	2.33	2.17	2.01	1.84	1.70	1989
		1.77	1.72	1.60	1.49	1.36	1.26	1993
K	Warehouse/Storage	0.80	0.66	0.56	0.48	0.43	0.40	1989
		0.60	0.50	0.42	0.36	0.32	0.30	1993

TABLE C.2. Exterior Area Codes

Area Type Code	Area Type	Unit Power Density
1	Exit (with or without canopy)	25 W/Lin. ft of door opening
2	Entrance (without canopy)	30 W/Lin. ft of door opening
3	Entrance (with canopy) high traffic	10 W/ft^2 of canopied area
4	Entrance (with canopy) light traffic	4 W/ft^2 canopied area
5	Entrance (with canopy) loading area	0.40 W/ft^2
6	Entrance (with canopy) loading door	20 W/Lin. ft of door opening
7	Building Exterior surface facade	0.25 W/ft^2 of surface area to be illuminated
8	Storage and non-manufacturing work area	0.20 W/ft^2
9	Other activity areas for casual use	0.10 W/ft^2
10	Private driveway/walkways	0.10 W/ft^2
11	Public driveways/walkways	0.15 W/ft^2
12	Private parking lots	0.12 W/ft^2
13	Public parking lots	0.18 W/ft^2

TABLE C.3. Space Type Codes

Space Type Code	Description	Unit Power Density 1989	1993
Auditorium			
1	Auditorium	1.6	1.4
Corridor			
2	Corridor	0.8	0.8
Classroom/Lecture Hall			
3	Classroom/Lecture Hall	2.0	1.0
Electrical/Mechanical Equipment Room			
4	General	0.7	0.7
5	Control Room	1.5	1.5
Food Service			
6	Fast Food/Cafeteria	1.3	0.8
7	Leisure Dining	2.5	1.4
8	Bar/Lounge	2.5	1.3
9	Kitchen	1.4	1.4
Recreation/Lounge			
10	Recreation/Lounge	0.7	0.5
Stair			
11	Active Traffic	0.6	0.6
12	Emergency Exit	0.4	0.4
Toilet and Washroom			
13	Toilet and Washroom	0.8	0.5
Garage			
14	Auto and Pedestrian Circulation	0.3	0.25
15	Parking Area	0.2	0.2
Laboratory			
16	Laboratory	2.3	2.2
Library			
17	Audio Visual	1.1	1.1
18	Stack Area	1.5	1.5
19	Card Filing & Cataloging	1.6	0.8
20	Reading Area	1.9	1.0
Lobby (General)			
21	Reception and Waiting	1.0	0.55
22	Elevator Lobbies	0.8	0.4
Atrium (Multi-Story)			
23	First 3 Floors	0.7	0.4
24	Each Additional Floor	0.2	0.15
Locker Room and Shower			
25	Locker Room and Shower	0.8	0.6
Offices (Partitions > 4.5 ft below ceiling). Enclosed offices, all open plan offices without partitions or with partitions lower than 4.5 ft below the ceiling.			
26	Reading, Typing & Filing	1.8	1.3
27	Drafting	2.6	2.2
28	Accounting	2.1	1.8
Offices (Partitions 3.5-4.5 ft below ceiling). Open plan offices 900 ft^2 or larger with partitions 3.5 to 4.5 ft below the ceiling.			
29	Reading, Typing & Filing	1.9	1.5
30	Drafting	2.9	2.6
31	Accounting	2.4	2.1
Offices (Partitions < 3.5 ft below ceiling). Open plan offices 900 ft^2 or larger with partitions higher than 3.5 ft below the ceiling. Offices less than 900 ft^2 shall use types 26, 27, or 28.			
32	Reading, Typing & Filing	2.2	1.7
33	Drafting	3.4	3.0
34	Accounting	2.7	2.4
Common Activity Areas			
35	Conference/Meeting Room	1.8	1.3
36	Computer/Office Equipment	2.1	2.1
37	Inactive Filing	1.0	1.0
38	Mail Room	1.8	1.8
Shop (Non-Industrial)			
39	Machinery	2.5	2.5
40	Electrical/Electronic	2.5	2.5
41	Painting	1.6	1.6
42	Carpentry	2.3	2.3
43	Welding	1.2	1.2
Storage & Warehouse			
44	Inactive Storage	0.3	0.2
45	Bulky Active Storage	0.3	0.3
46	Fine Active Storage	1.0	0.9
47	Material Handling	1.0	1.0
Unlisted Space			
48	Unlisted Space	0.2	0.2

TABLE C.3. (contd)

Space Type Code	Description	Unit Power Density 1989	Unit Power Density 1993
Airport, Bus & Rail Station			
49	Baggage Area	1.0	0.75
50	Concourse/Main Thruway	0.9	0.45
51	Ticket Counter	2.5	1.3
52	Waiting & Lounge Area	1.2	0.6
Bank			
53	Customer Area	1.1	0.8
54	Banking Activity Area	2.8	2.2
Barber & Beauty Parlor			
55	Barber & Beauty Parlor	2.0	1.6
Church, Synagogue, Chapel			
56	Worship/Congregational	2.5	1.3
57	Preaching & Sermon/Choir	2.7	1.8
Dormitory			
58	Bedroom	1.1	0.6
59	Bedroom with Study	1.4	1.3
60	Study Hall	1.8	0.9
Fire & Police Department			
61	Fire Engine Room	0.7	0.7
62	Jail Cell	0.8	0.4
Hospital/Nursing Home			
63	Corridor	1.3	0.9
64	Dental Suite/Exam/Treatment		1.61.4
65	Emergency	2.3	2.0
66	Laboratory	1.9	1.7
67	Lounge/Waiting Room	0.9	0.6
68	Medical Supplies	2.4	2.4
69	Nursery	2.0	1.6
70	Nurse Station	2.1	1.8
71	Occu./Physical Therapy	1.6	1.4
72	Patient Room	1.4	0.9
73	Pharmacy	1.7	1.5
74	Radiology	2.1	1.8
Surgery & O.B. Suites			
75	General Area	2.1	1.8
76	Operating Room	7.0	6.0
77	Recovery	3.0	2.0
Hotel/Conference Center			
78	Banquet/Multipurpose Room	2.4	1.4
79	Bathroom/Powder Room	1.2	0.6
80	Guest Room	1.4	0.7
81	Public Area	1.2	0.8
82	Exhibition Hall	2.6	1.3
83	Conference/Meeting	1.8	1.5
84	Lobby	1.9	1.3
85	Reception Desk	2.4	2.4
Laundry			
86	Washing	0.9	0.6
87	Ironing & Sorting	1.3	1.3
Museum & Gallery			
88	General Exhibition	1.9	1.2
89	Inspection/Restoration	3.9	3.0
90	Inactive Artifacts Storage	0.6	0.25
91	Active Artifacts Storage	0.7	0.5
Post Office			
92	Lobby	1.1	0.8
93	Sorting & Mailing	2.1	2.1
Service Station/Auto Repair			
94	Service Station	1.0	0.8
Theater			
95	Performance Arts	1.5	1.1
96	Motion Picture	1.0	0.75
97	Lobby	1.5	1.0
Retail Establishments (Merchandising & Circulation Area) Applicable to all lighting, including accent and display lighting, installed in merchandising and circulation areas.			
98	Type A (Mass Merchandising)		5.66.0
99	Type B (Service Retail)	3.2	2.9
100	Type C (Mixed Use Retail)	3.3	2.7
101	Type D (Specialty Shop)	3.1	2.5
102	Type E (Fine Merchandise)	2.8	2.4
103	Type F (Service Establishment)	2.7	2.6
104	Mall Concourse	1.4	0.6

TABLE C.3. (contd)

Space Type Code	Description	Unit Power Density 1989	Unit Power Density 1993
Retail Support			
105	Tailoring	2.1	2.1
106	Dressing/Fitting Rooms	1.4	1.1
All Sports			
107	Seating Area	0.4	0.4
Badminton			
108	Club	0.5	0.5
109	Tournament	0.8	0.8
Basketball/Volleyball			
110	Intramural	0.8	0.8
111	College	1.3	1.3
112	Professional	1.9	1.9
Bowling			
113	Approach Area	0.5	0.5
114	Lanes	1.1	1.1
Boxing/Wrestling (Platform)			
115	Amateur	2.4	2.4
116	Professional	4.8	4.8
Gymnasium			
117	General Exercise & Recreation	1.0	1.0
Handball/Racquetball/Squash			
118	Club	1.3	1.3
119	Tournament	2.6	2.6
Ice Hockey			
120	Amateur	1.3	1.3
121	College/Professional	2.6	2.6
Skating Rink			
122	Recreational	0.6	0.6
123	Exhibition/Professional	2.6	2.6
Swimming			
124	Recreational	0.9	0.9
125	Exhibition	1.5	1.5
126	Underwater	1.0	1.0
Tennis			
127	Recreational (Class III)	1.3	1.3
128	Club/College (Class II)	1.9	1.9
129	Professional (Class I)	2.6	2.6
Table Tennis			
130	Club	1.0	1.0
131	Tournament	1.6	1.6

APPENDIX D

USER COMMENT FORM

APPENDIX D

USER COMMENT FORM

The following form is for your comments and suggests on or problems with the program or documentation.

PROGRAM AND DOCUMENT COMMENTS

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

1. Which version of LTGSTD are you using?

   Version _____

2. Please evaluate the user's guide:

	Excellent				Poor
Technical Accuracy	5	4	3	2	1
Organization	5	4	3	2	1
Procedures	5	4	3	2	1
Figures	5	4	3	2	1
Examples	5	4	3	2	1

3. Rate your own knowledge of personal computers:

   ___ First-time computer user ___ Intermediate user

   ___ Advanced user ___ Programmer

4. What errors did you find in the user's guide?

Error	Page No.
_____	_____
_____	_____
_____	_____
_____	_____

5. What problems/bugs did you find in the program? Please list the keystrokes you used, if possible. _____

_____

_____

_____

_____

6. What other comments would you like to make about the program or the user's guide? _____

_____

_____

_____

_____

Thank you for taking the time to complete this form. Please return it to:

Building Energy Standards Program Office
Pacific Northwest Laboratory
P.O. Box 999, MSIN K5-02
Richland, WA 99352
Facsimile (509) 375-3614